

indicating the temperature of the etchant from the temperature sensor and transmitting an etching termination signal to the etch bath when the temperature reaches a predetermined target temperature to terminate the etching of the glass substrate, and wherein a reaction heat generated from etching the glass substrate changes the temperature of the etchant.--

Cut

REMARKS

In the Final Office Action dated January 30, 2001, the Examiner rejected claims 1 and 19-20 as being unpatentable over Nelson in view of Chung, rejected claims 2, 7 and 10 as being unpatentable over Nelson in view of Chung and Tittle, rejected claims 3-6, 8-9 and 11-18 as being unpatentable over Nelson in view of Chung, Jones and Tittle.

Applicants respectfully assert that the prior art references, singly or in combination, do not teach or suggest all of the claim limitations of at least amended independent claims 1, 10 and 11.

Claim 1

As the Examiner noted in the Action, Nelson fails to show an etch bath having a bubble plate. The Examiner cited Chung et al. as disclosing the elements not taught by Nelson.

Chung et al. specifically discloses that “[a] reagent chemical is directed along a first pipe portion. . .and which contains a plurality of jets...” Chung et al., col. 1, lines 58 - 60 (emphasis added). However, the integrated pipe unit 17 of Chung et al. cannot read on the claimed bubble plate. Claim 1 recites “...a bubble plate for generating nitrogen bubbles, the bubble plate being connected to a nitrogen inlet pipe, the nitrogen inlet pipe being connected to a nitrogen supply line...” The Examiner asserts that the integrated pipe unit transmits inert

gas to create a bubbling condition within the tank for sufficient agitation. However, the integrated pipe unit of Chung et al. is not connected to a nitrogen supply line via an inlet pipe. Thus, the integrated pipe unit cannot read on the claimed bubble plate.

Furthermore, the Examiner states that the combined stream 31 of Nelson reads on the connecting passage, as recited by the claim. However, the combined stream 31 of Nelson cannot read on the claimed connecting passage. Claim 1 recites “a connecting passage connecting the first and second tanks for transferring the separated diluted etchant from the second tank to the first tank.” The Examiner asserts that the etcher of Nelson reads on the claimed first tank and that the rinse chamber of Nelson reads on the claimed second tank. Office Action, Paper No. 23, at P. 3 (citations omitted). However, the combined stream 31 of Nelson does not connect the etcher and the rinse chamber; the combined stream 31 of Nelson connects the bulk storage tank to the etcher. Thus, the combined stream 31 of Nelson cannot read on the claimed connecting passage.

Accordingly, with regard to claim 1, Nelson fails to teach or suggest at least an etch bath having a bubble plate, and a connecting passage connecting a first tank with a second tank, all of which are recited by claim 1.

Therefore, Applicants assert that the combination of references fails to teach or suggest all of the claim elements, as is required to support *prima facie* obviousness.

Claim 10

Claim 10 and its dependent claim 20 each recite *inter alia* the following elements:

a control unit for receiving a signal indicating the temperature of the etchant from the temperature sensor and

24/24
Final
CJL/16

Yes.
Through
27, 11 and
values
2a, 36.

transmitting an etching termination signal to the etch bath when the temperature reaches a target temperature,

wherein a reaction heat generated from etching the glass substrate changes the temperature of the etchant.

In the Office Action, the Examiner rejects claim 10 by citing the rejection of claim 1 over Nelson and Chung et al., in further view of Tittle.

Chung et al. fails to cure the deficiencies of Nelson in that Chung et al. fails to teach or suggest at least a glass substrate, temperature sensor and control unit. Furthermore, Nelson and Chung et al., even if combined, fail to teach or suggest at least a temperature sensor and a control unit as recited in amended claim 10.

The Examiner cites Tittle as disclosing the elements lacking in Nelson and Chung et al.. Specifically, the Office Action states “Tittle et al disclose a process control system having a plurality of sensors for sensing various parameters. One of the parameters for controlling the process may include temperature. A formula may be used to compute bath effectiveness based on the parameters detected. Any variation of the effectiveness triggers a responsive change. A response change can be the termination of the etch process.” Office Action, Paper No. 23, at P. 4 (citations omitted).

Applicants respectfully disagree. Tittle fails to teach or suggest at least a control unit for receiving a signal indicating the temperature of the etchant from the temperature sensor and transmitting an etching termination signal to the etch bath when the temperature sensor reaches a target temperature, wherein a reaction heat generated from etching the glass substrate changes the temperature of the etchant, as in claim 10.

22
C4QH
C5QH

Therefore, Applicants assert that the combination of references including Nelson, Chung et al. and Title fails to teach or suggest all of the claim elements, as is required to support *prima facie* obviousness.

Claim 11

Claim 11 and its dependent claims 12-18, and new claim 21 each recite *inter alia* the following elements:

an etch bath having a bubble plate for generating nitrogen bubbles, the bubble plate being connected to a nitrogen inlet pipe, the nitrogen inlet pipe being connected to a nitrogen supply line, the etch bath being connected to the first tank connected to the first tank for receiving the first etchant and adapted to etch the glass substrate;

a separation tank adapted to receive the residual etchant from the etch bath for separating the diluted etchant from the residue material, the separation tank connected to the etch bath via an etchant outlet pipe, the separation tank transferring the separated diluted etchant to the first tank;

In the Office Action, the Examiner rejects claim 11 by citing the rejection of claim 1 over Nelson and Chung et al., in further view of Jones et al. and Title.

Nelson fails to teach or suggest the claimed bubble plate as discussed above. Chung et al. fails to cure the deficiencies of Nelson. Moreover, Nelson and Chung et al. fail to teach or suggest at least the first tank, the etch bath, the separation tank, the rinse bath, the dry bath, the etchant supply source, the solvent supply source, and the control unit, as recited in claim 11.

The Examiner cites Jones et al. as disclosing the elements lacking in Nelson and Chung et al. Specifically, the Office Action states “Jones et al disclose a chemical processing

apparatus containing a plurality of treatment chambers having a dip chamber with filling pumps, a spray chamber which serves as a rinse chamber or drying chamber. The rinse chamber would be filled with deionized water from a deionized reservoir. An essential part of the apparatus is a conveyor means for automatically transferring the workpieces from treatment chamber to treatment chamber. The conveyor allows for a plurality of substrates to be processed substantially at the same time. Using a pump to move fluid from one chamber to another is conventional.” Office Action, Paper No. 23, at P. 5 (citations omitted). The Examiner further cites Tittle as disclosing “a temperature sensor or a concentration measuring.” Id.

However, Tittle and Jones et al. fail to cure the deficiencies of Nelson and Chung et al. *inter alia*, Tittle and Jones et al. fail to teach or suggest at least etching of a glass substrate, the first tank, the separation tank, and the etchant supply source.

Therefore, Applicants assert that the combination of references fails to teach or suggest all of the claim elements, as is required for *prima facie* obviousness.

Therefore, Applicants respectfully request reconsideration of the claims rejected over the combination of Nelson, Chung et al., Tittle, and Jones et al.

In addition, for similar reasons, Applicants respectfully submit that new claims 21-25 are allowable over the art of record.

In view of the foregoing Remarks, Applicants respectfully submit that the application is in condition for allowance and early, favorable action is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is invited to call the undersigned attorney at (202) 624-1200 to

Application No.: 09/039,438
Art Unit: 1763

Docket No.: 8733.120.01
Page 9

discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

LONG, ALDRIDGE & NORMAN, LLP

By: 
Song K. Yung
Registration No. 35,210

Rebecca A. Goldman
Registration No: 41,786

Date: January 16, 2002
Long, Aldridge & Norman, LLP
701 Pennsylvania Avenue, N.W.
Suite 600
Washington, D.C. 20004
(202) 624-1200